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⑯ Child restraint device.

⑯ An adjustable child restraint car seat comprises a base which can be attached to the seat of a vehicle by the vehicle's lap belts. A seat having a reclinable back portion is latch locked onto a pivot which is swivel mounted on the base. A first adjustable means for holding the reclinable back in fixed relation to the seat portion and a second, adjustable means for holding the pivot in fixed relation to the base allow reconfiguration of the child restraint car seat as required.

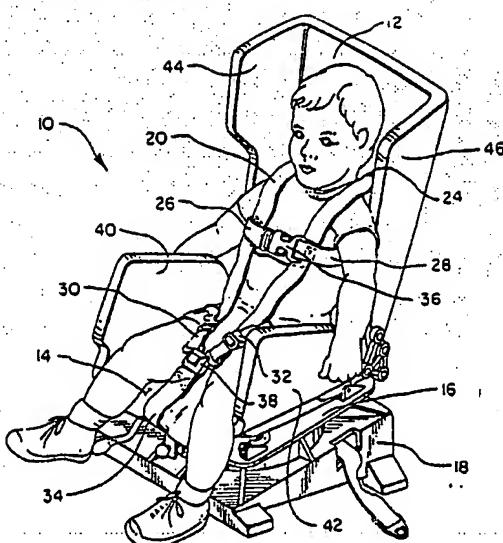


FIG. 1

## A RESTRAINT DEVICE

The present invention relates to restraint devices useful for holding a person in a vehicle. More particularly, this invention concerns restraints for holding a child in a vehicle, in particular concerns child restraint car seats.

Specifically, the present invention relates to reclinable and rotatable child restraint car seats for a child which can be adjusted into various configurations according to the needs and desires of the operator. The present invention is particularly, but not exclusively, useful for the protection of children during vehicular travel and for ease in placing them in the vehicle and removing them from the vehicle.

Although vehicle safety has always been of general concern to motorists, we have recently seen increased attention being given to the safety concerns of the individual passenger. More specifically, both the enactment of seat belt laws and the conduct of information campaigns which encourage passengers to "Buckle-Up" are indicative of governmental attempts to arouse public awareness of the importance of passenger safety.

Of particular concern in this matter, is the safety of children. Whereas, restraint harnesses incorporated into the vehicle's structure are generally sufficient for the safety of older children and adults, infants pose several unique problems which are well known by anyone who has travelled with them. Without specifically enumerating these problems, it is apparent that the infant's safety and comfort are of great importance. Additionally, it is desirable that the infant child be conveniently accessible while being restrained and that the device or apparatus used to restrain the child be easily operable. Further, it is desirable that the child restraint device be versatile and adaptable to meet the various needs of the operator.

Several devices have been proposed in the past which are useful for transporting children in a vehicle. In each instance, the prior device has addressed a specific problem and disclosed inventions intended to increase both safety and convenience. For example, U.S. Patent No. 3,404,917 discloses a bracket for mounting a baby seat on the bench portion of the passenger seat of a vehicle. U.S. Patent No. 4,205,877 discloses structure for moving a child's car seat between a slumbering and a sitting position. Still another feature for improving a child's car seat is disclosed in U.S. Patent No. 4,113,306. Specifically, the device disclosed in U.S. Patent No. 4,113,306 is a vehicular safety restraint seat for a child which is convertible to a stroller.

While the prior art discloses various devices which include reclinable seats and convertible

strollers, there is no teaching which maximizes the potential configuration for a child restraint car seat while the seat is secured to the vehicle.

It is an object of this invention to provide an improved restraint device for holding a person in a vehicle.

According to one aspect of this invention there is provided a restraint device for holding a person in a vehicle said restraint device being characterised by:

10 a base;  
a pivot, swivel mounted on said base;  
a seat, attached to said pivot;  
15 a back, attached to said seat; and  
means for fixing said pivot relative to said base.

According to another aspect of this invention there is provided a restraint device for holding a person in a vehicle said restraint device being characterised by:

20 a seat;  
a back reclinably attached to said seat;  
25 a harness attached to said seat and said back and adjustable with respect thereto for restraining the child therein;  
a swivelable pedestal having means for securing said pedestal to the vehicle; and  
30 means for removably attaching said seat to said pedestal.

The present invention may provide a child restraint car seat with a reclinable back which can be turned or swivelled while secured in the car to orient the child lengthwise in the vehicle.

The preferred embodiment of the child restraint car seat of the present invention comprises a base which can be attached and secured to the seat of the vehicle. A pivot, which may be swivel mounted on the base, can be gripped and held relative to the base in predetermined positions. A seat which may have latch connectors may be removably attached to the pivot by the interaction of the latch connectors with attachment pins on the pivot. A back may be pivotally attached to the seat and may be connected thereto by means which allow the back to be reclined into predetermined positions relative to the seat. A seven-point restraint harness may be provided to hold the child against the seat and back. In use, the seat and reclinable back in combination can be attached to or removed from the pivot by manual operation of the latch means. When attached to the pivot the combination of seat and back can be swivelled relative to the

base and held in predetermined relationships thereto. While the base is secured to the vehicle, adjustments of the seat and back allow the operator to configure the combination for easy handling of the child.

The present invention recognizes that in addition to having a reclining capability, it is desirable to have the capability of positioning the child in the car in other than a forward and back orientation. Specifically, the present invention recognizes that it is often desirable and advantageous to orient the child lengthwise on the passenger seat of a vehicle while the child restraint car seat is secured to the vehicle. Preferably this lengthwise orientation can be accomplished while still having the capability of reclining the seat into a slumbering position. Further, the present invention recognizes it is desirable that a seat, having the versatile configuration discussed above, be easily removed from the vehicle and adapted for use as a stroller.

It is an advantage of the present invention that it provides a child restraint device which provides safety for the child regardless of the configuration of the device, i.e. whether it be in an upright or reclined configuration or positioned in a front-back or lengthwise orientation.

It is another advantage of the present invention that it provides a child restraint device which is easily removed from the vehicle and converted for use as a stroller.

Yet another advantage of this invention is that it provides a child restraint device which is easy and relatively inexpensive to manufacture.

Reference is now made to the accompanying drawings in which:

Figure 1 is a front perspective view of the child restraint device;

Figure 2 is a side elevational view of the device in a sitting position;

Figure 3 is a back elevational view of the device;

Figure 4 is a side elevational view of the device in a reclined position;

Figure 5 is an exploded perspective view of the pedestal for the present invention;

Figure 6A is a side view of a front latch assembly in an unengaged position;

Figure 6B is a front view of the front latch assembly in an unengaged position;

Figure 7A is a side view of the front latch assembly in an engaged position;

Figure 7B is a front view of a front latch assembly in an engaged position; and

Figure 8 is a side view of a rear attachment fork in an engaged position.

The child restraint device of the present invention is shown in Figure 1 and generally designated 10. As shown, child restraint device 10 comprises a

back 12 which is pivotally connected with a seat portion 14 in a manner to be subsequently disclosed in greater detail. Back 12 is reclinable relative to seat 14 to allow restraint device 10 to be configured either for a sitting position, generally shown in Figures 1 and 2, or in a reclining position generally shown in Figure 4.

As intended for the present invention, pivot 16 and base 18 constitute a pedestal on which seat 14 can be attachably mounted. Specifically, seat 14 of restraint device 10 is mounted on pivot 16 which is swivel mounted onto base 18. When seat 14 is attached to pivot 16, it will be appreciated that the seat 14, in combination with pivot 16, can be swivelled relative to the base 18. This allows reconfiguration of restraint device 10 by rotation of seat 14 and back 12 with respect to the base 18.

A harness 20 is provided with restraint device 10 for the purpose of holding an infant child against restraint device 10 during its use. As will be appreciated by those skilled in the art, harness 20 is adjustable to be specifically configured in accordance with the shape and size of the child. As clearly shown in Figure 1, harness 20 is a seven-point restraint harness four of which are attached to back 12 of the restraint device 10 at the points 22, 24, 26 and 28. With these attachment points, the child can be positioned with its arms respectively inserted through the opening created between attachment points 22 and 26 and through the opening created between attachment points 24 and 28. Further, a chest buckle 36 is provided to allow these parts of the harness to hold and restrain the child against back 12. Harness 24 is also attached to seat 14 at attachment points 30, 32 and 34. To help hold and restrain the child in device 10, the harness strap from attachment point 34 is brought within the crotch of the child so that one of the child's legs is extended through the opening created between attachment point 30 and 34 and the other leg is extended through the opening created between attachment points 32 and 34. A lap buckle 38 is provided, as shown, to bring the lower portion of harness 20 into position to restrain the child against the seat 14.

Additional safety features of the restraint device 10 are provided by sideboard 40 and 42 which are positioned relative to seat 14 to restrict lateral movement of the lower portion of the child's body with respect to restraint device 10. Restraint device 10 is also provided with side pieces 44 and 46 to restrict the sideward movement of the upper portion of the child's body with respect to back 12 of the restraint device 10.

Cross referencing Figure 1 and Figure 3 shows the cooperation of structure employed by the present invention which allows back 12 to recline relative to seat 14. More specifically, it is seen in

Figure 3 that back supports 48 and 50 are attached to back 12 by any means well known in the art, such as by bolting. It is understood that means such as cementing or welding back supports 48 and 50 to back 12 would also suffice for the present invention. Further, it can be appreciated that seat supports 52 and 54 are attached to seat 14 in a like manner. While only seat support 52 is shown in Figure 2 as extending along the length of seat 14 to provide rigidity, it should be recognized that seat support 54 extends along the underside of seat 14 in a like manner.

As perhaps best seen in Figure 3, back supports 48 and 50 interact with seat supports 52 and 54 to provide means for reclining back 12 relative to seat 14. The pivotal connection between back 12 and seat 14 is accomplished by connector pins 56 and 58 which together establish an axis about which back 12 can be rotated or reclined relative to seat 14. Specifically, connector pin 56 interacts between back support 48 and seat support 52 while back support 50 interacts with seat support 54.

Referring now to Figure 2, it can be seen that seat support 52 is provided with a series of holes 60, 62 and 64 which are radially located and equidistant from the rotational axis defined by the hole into which connector pin 56 is inserted. Although not shown, it is to be understood that seat support 54 is formed with a series of holes similar to those of seat support 52. These holes, like holes 60, 62 and 64 are radially located and equidistant from the axis defined by connector pins 56 and 58.

With reference now to Figure 3, it is shown that pins 66 and 68, respectively, cooperate with back supports 48 and 50 by insertion through holes (not shown) formed thereon. As intended for the present invention, these pins 66 and 68 extend through back supports 48 and 50 with pin 66 being insertable into holes 60, 62, 64 on seat support 52 and pin 68 being insertable into corresponding holes similarly located on seat support 54. It will be understood by the skilled artisan that upon simultaneous insertion of retainer pins 66 and 68, respectively, through back supports 48 and 50 and through seat supports 52 and 54 that back 12 will be held rigid in with respect to the seat 14. On the other hand, when retainer pins 66 and 68 are withdrawn from holes in seat support 52 and 54, back 12 can be reclined or moved with respect to seat 14.

Activation of retainer pins 66 and 68 is accomplished by an actuator 70 which is located on back 12 and operatively connected to retainer pins 66 and 68. Actuator 70 is operable by manipulation of the handle 72 which is also located on back 12. As intended for the present invention, manipulation of handle 72 transmits a force through cable 74 which

causes actuator 70 to simultaneously withdraw retainer pins 66 and 68 from corresponding holes located in seat supports 52 and 54. This action respectively disengages back support 48 from seat support 52 and back support 50 from seat support 54 to allow repositioning of back 12 with respect to seat 14. The result is perhaps best seen by comparing the configuration of child restraint device 10, as it is shown in Figure 2, with the configuration shown in Figure 4. The upright sitting position of Figure 2 is accomplished when retainer pin 66 is inserted through back support 48 and into hole 60 on seat support 52. While retainer pin 66 is inserted into hole 60, retainer pin 68 is inserted into the corresponding hole as seat support 54 to hold back support 50 in a fixed relationship with seat support 54.

In Figure 4, restrain device 10 is shown in a reclining position. In this position, retainer pin 66 is inserted through back support 48 and into hole 64 located on seat support 52. Likewise, retainer pin 68 is inserted through back support 50 and into a hole (not shown) located on seat support 54 which corresponds to hole 64. Thus, for the upright position shown in Figure 2, or the reclining position shown in Figure 4, or the intermediate position wherein retainer pin 66 is inserted into hole 62 and retainer pin 68 is inserted into a corresponding hole on seat support 54, back 12 can be fixedly positioned relative to seat 14.

The pedestal for the present invention on which seat 14 is removably mountable is best shown in Figure 5. As seen in Figure 5, the pedestal comprises a pivot 16 and base 18. Specifically, pivot 16 comprises a platform 84 on which are affixed a rear attachment pin 76 and a rear attachment pin 78. Further, platform 84 is provided with a front attachment pin 80 and a front attachment pin 82. Each of the attachment pins 76, 78, 80 and 82 are attached to respective mounts. For example, rear attachment pin 76 is shown attached to a mount 116 and front attachment pin 80 is shown attached to a mount 110. On the side of platform 84 opposite from attachments pins 76, 78, 80 and 82 is a ring 86. Ring 86 is formed with a series of holes of which hole 88 and hole 90 are representative. For purposes of the present invention four such holes are utilized to permit the swivelling of pivot 16 through a 90° rotation.

Also shown in Figure 5 is the base 18 of the present invention. Base 18 is provided with a ring 94 which has an inside diameter that is slightly larger than the outside diameter of the ring 86. Thus, pivot 16 can be joined to base 18 by a shaft 92 in a manner which provides for insertion of ring 86 within the ring 94. It will be appreciated that the interaction of ring 86 with ring 94 provides added lateral stability for the pedestal while still permitting

relative rotational movement between pivot 16 and base 18.

A housing 96, also shown in Figure 5, is mounted on base 18 and holds a manually operable spring-loaded bolt 98. The bolt 98 is spring-biased for insertion into holes on ring 86 to hold ring 86 fixed relative to ring 94. Withdrawal of the bolt 98 from a hole in ring 86 clears the inside surface between rings 86 and 94 to allow for free rotation or swivelling of the pivot 16 relative to the base 18. Thus, wherever pivot 16 is in a position where a hole, such as hole 88 or hole 90, is aligned with the bolt 98, release of the bolt 98 for insertion into the hole 88 or hole 90 fixes pivot 16 relative to base 18 and prevents further rotation therebetween. It is to be understood that while the spring-loaded bolt 98 is disclosed for the present invention as a preferred embodiment, any structure which clamps or fixes pivot 16 relative to base 18 is within the contemplation of the present invention.

As previously implied, seat 12 of restraint device 10 is removably attached to base 16 at the attachment pins 76, 78, 80 and 82. It will be appreciated by the skilled artisan that seat 12 may be slide-mounted onto base 16 by incorporating slide connectors well known in the pertinent art. More specifically, for the preferred embodiment, a pair of forks are attached on the underside and to the rear of seat 14. Also, a pair of latches are attached on the underside and to the front of seat 14. Fork 120 as shown in Figures 2 and 4 is representative of the two such form attachments to seat 14. Fork 120 can be associated with attachment pin 76 in a manner generally shown in Figure 8. Likewise, a corresponding fork (not shown) can be associated with attachment pin 78. Once the forks are associated with attachment pins 76 and 78, latches on seat 12 can then be attached to pivot 16.

The attachment of the latches of pivot 16 to the attachment pins 80 and 82 of base 18 can be best seen in reference to Figures 6A, 6B, 7A and 7B. In Figure 6A latch 100 is shown rotationally mounted on a mounting pin 102. Recognize that though not shown in the Figures, mounting pin 102 is fixedly attached in any manner well known in the pertinent art to the bottom of seat 12. Also, in Figure 6A, latch 100 is seen with an arm 104 and an extension 106 and front attachment pin 80 is shown in its relation to mount 110. A leaf spring 108, which is associated with mount 110 to urge against the engagement of latch 100 with front attachment pin 80, is shown in its relaxed position in Figure 6A. A trunnion 114 is attached to seat 12 and a lever 112 is rotationally mounted thereon. In the positions shown in Figures 6A and 6B, lever 112 is not interacting with latch 100. However, upon urging mounting pin 102 with associated latch 100 downward onto attachment pin 180, leaf spring 108 is

depressed and latch 100 is rotated about mounting pin 102 in a manner which brings arm 104 and extension 106 into cooperation with front attachment pin 80 substantially as shown in Figure 7A.

5 Then, with latch 100 in this position, lever 112 is biased to rotate about trunnion 114 to engage and retain latch 100 in the position shown in Figures 7A and 7B. The release of lever 112 by rotating it about trunnion 114 allows latch 100 to be returned to the position shown in Figures 6A and 6B for further disengagement of seat 14 from pivot 16.

In comparing the engaged and disengaged positions of latch 100 with respect to attachment pin 80 the respective front views of these positions shown in Figures 6B and 7B are helpful. More specifically, the views of Figures 6B and 7B show the interaction between latch 100 and lever 112.

Figure 8 shows a form 120 provided with tangs 118 and 122 which engagingly surround rear attachment pin 76. As stated above, rear attachment pin 76 is associated with mount 116 and provides a means for engagement with fork 120 to help hold seat 14 onto pivot 16. It is to be understood that the discussion concerning latch 100 in cooperation with attachment pin 80 and the cooperation of form 120 with attachment pin 76 has focused on only the right side of device 10. It is to be understood that a plurality of such attachment means can be used for the present invention. More specifically, as intended by the present invention, latch 100 and fork 120 are each one of a pair of such mechanisms. Another latch corresponding to latch 100 and another fork corresponding to fork 120 are provided for the other side of seat 14. With these means, seat 14 can be fixedly engaged with pivot 16 or released therefrom to lift and remove seat 14 from pivot 16 for use as desired by the operator.

40 This invention will now be described in operation.

For its operation the child restraint device 10 of the present invention is provided with a back portion 12 which is reclinable relative to seat 14 through manipulation of an actuator 70. More specifically, operation of handle 72 rotates actuator 70 to retract retainer pins 66 and 68 from holes in seat supports 52 and 54 which are respectively aligned with holes in back supports 48 and 50. Upon such a retraction of retainer pins 66 and 68, back 12 can be reclined and repositioned with respect to the seat 14 to align holes on back supports 48 and 50 with a new set of holes on seat supports 52 and 54. Once so aligned, release of handle 72 causes reinsertion of retainer pins 66 and 68 into the aligned holes to rigidly hold back 12 relative to seat 14.

Once back 12 is aligned with respect to seat

14 a child can be placed within the restraint device 10 and secured therein by manipulation of the harness 20. More specifically, the seven-point restraint harness 20 of the present invention allows for harness support around the arms of the child, as well as across the waist of the child and up through the crotch. Chest buckle 36 and lap buckle 38 are provided as shown in Figure 1 for securing harness 20 in a manner which will restrain the child in the restraint device 10.

Seat 14 and back 12, in combination, can be removably attached with pivot 16 by respectively engaging fork 120, and the corresponding form (not shown) on the other side of seat 14, with rear attachment pins 76 and 78. Once these forks are engaged with rear attachment pins 76 and 78, latch 100 and the corresponding latch (not shown) on the other side of seat 14 are brought into respective engagement with front attachment pins 80 and 82. Depression of the seat 12 against pivot 16 causes engagement of the latches with front attachment pins 80 and 82. This engagement depresses leaf spring 108, and a corresponding leaf spring for the other latch point, to allow latch 100 to rotate about mounting pin 102 and engage with front attachment pin 80 in a manner substantially as shown in Figure 7A. Likewise, the latch (not shown) corresponding to latch 100, engages with front mounting pin 82. Once such engagements are accomplished lever 112 is activated to lock the latch 100 in the position shown in Figure 7A. The actual positioning of lever 112 in this position is best seen by reference to Figure 7B. Similar operation of the latch (not shown) on the opposite front side of seat 12 causes engagement of the seat 12 with the pivot 16.

As best seen by reference to Figure 5, pivot 16 is provided for cooperative engagement with base 18 in a manner which causes the ring 86 of pivot 16 to be inserted within the space defined by the ring 94 on base 18. A spring loaded bolt 98 held in housing 96 is aligned for cooperation for holes 88 and 90 and other similar holes (not shown) located on the ring 86 of pivot 16. It will be understood by the skilled artisan that insertion of spring-loaded bolt 98 into any of the holes located on ring 86 of pivot 16 will fix the relationship of pivot 16 relative to base 18. Withdrawal of pin 98 from the holes on ring 86 will free pivot 16 relative to base 18 and allow a swivelling or rotating action therebetween.

In accordance with the above discussion, operation of handle 72 permits reclining of back 12 relative to seat 14 and operation of spring-loaded bolt 98 permits swivelling of pivot 16 relative to the base 18. Thus, one attachment between seat 14 and pivot 16 has been accomplished by the interaction of the latches and corresponding attachment pins, restraint device 10 of the present invention

provides a reclinable child restraint seat which can be swivelled relative to the base 18 to facilitate handling of the child.

It will be understood that, when seat 14 and its associated reclinable back 12 are disengaged and removed from pivot 16, form 120 and its corresponding counterpart on the other side together with the latch 100 and its corresponding counterpart on the other side of seat 14 can be engaged with a means (not shown) to provide a stroller for the child. More specifically, it is intended by the present invention that the seat 14 be engageable with a wheeled platform in a manner similar to that disclosed for the interaction and connection of seat 14 with pivot 16. This would allow the seat 14 and its associate reclinable back 12 to be operated as a stroller (not shown). The intent also of the present invention is to provide attachments through structures such as fork 120 and latch 100 to allow for the interaction of the seat 14 with various platforms which can be designed and incorporated to accomplish the desires of the operator.

Although not specifically set forth in the disclosure for the present invention, it is within contemplation of the present invention and within the intention of the present invention that the base 18 be secured relative to the vehicle in which the restraint device 10 is to be used. More specifically, and in accordance with teaching of prior disclosures, it is intended that base 18 be secured to the seat of vehicle by the lap belts or safety belts provided and incorporated into the vehicle for normal use by an adult during transportation.

## Claims

1. A restraint device for holding a person in a vehicle, said restraint device being characterised by:

a base;  
a pivot, swivel mounted on said base;  
a seat, attached to said pivot;  
a back, attached to said seat; and  
means for fixing said pivot relative to said base.

2. A restraint device according to Claim 1 wherein said seat is removably attached to said pivot.

3. A restraint device according to Claim 1 or 2 wherein said back is reclinably attached to said seat.

4. A restraint device according to any preceding claim further comprising a restraint harness having a plurality of straps, said straps being respectively attached to said back at a plurality of

locations and attached to said seat at a plurality of locations and adjustable with respect to said seat and said back for securing the person in said device.

5. A restraint device for holding a person in a vehicle, said restraint device being characterised by:

a seat;  
a back reclinably attached to said seat;  
a harness attached to said seat and said back and adjustable with respect thereto for restraining the child therein;  
a swivelable pedestal having means for securing said pedestal to the vehicle; and  
means for removably attaching said seat to said pedestal.

6. A restraint device according to Claim 5 further comprising means for immobilizing said pedestal.

7. A restraint device according to Claim 5 or 6 wherein said pedestal comprising:

a base; and  
a pivot, swivel mounted on said base.

8. A restraint device according to Claim 7 further comprising means for fixing said pivot relative to said base.

9. A restraint device according to any of Claims 5 to 8 wherein said restraint harness comprises a plurality of straps attached to said back and said seat at a plurality of locations and adjustable with respect to said seat and said back for securing the child relative to said car seat.

10. A restraint device according to any of Claims 1 to 4 or 8 wherein said pivot fixing means comprises a bolt engageable between said pivot and said base.

11. A restraint device according to any of Claims 1 to 4, 8 or 9 wherein said pivot fixing means comprises a spring loaded bolt engageable between said pivot and said base.

12. A restraint device according to any preceding claim further comprising means for fixing said back relative to said seat.

13. A restraint device according to Claim 12 wherein said back fixing means comprises:

a plurality of back support means attached to said back;  
a plurality of seat support means fixedly attached to said seat; and  
means for rigidly holding said back support means relative to said seat support means.

14. A restraint device according to Claim 13, wherein said means for rigidly holding said seat support relative to said back support is a pin interconnected therebetween.

5 15. A restraint device according to any preceding claim which further comprises:

a plurality of pin assemblies attached to said pivot; and

10 latch means attached to said seat and engageable with said pin assemblies.

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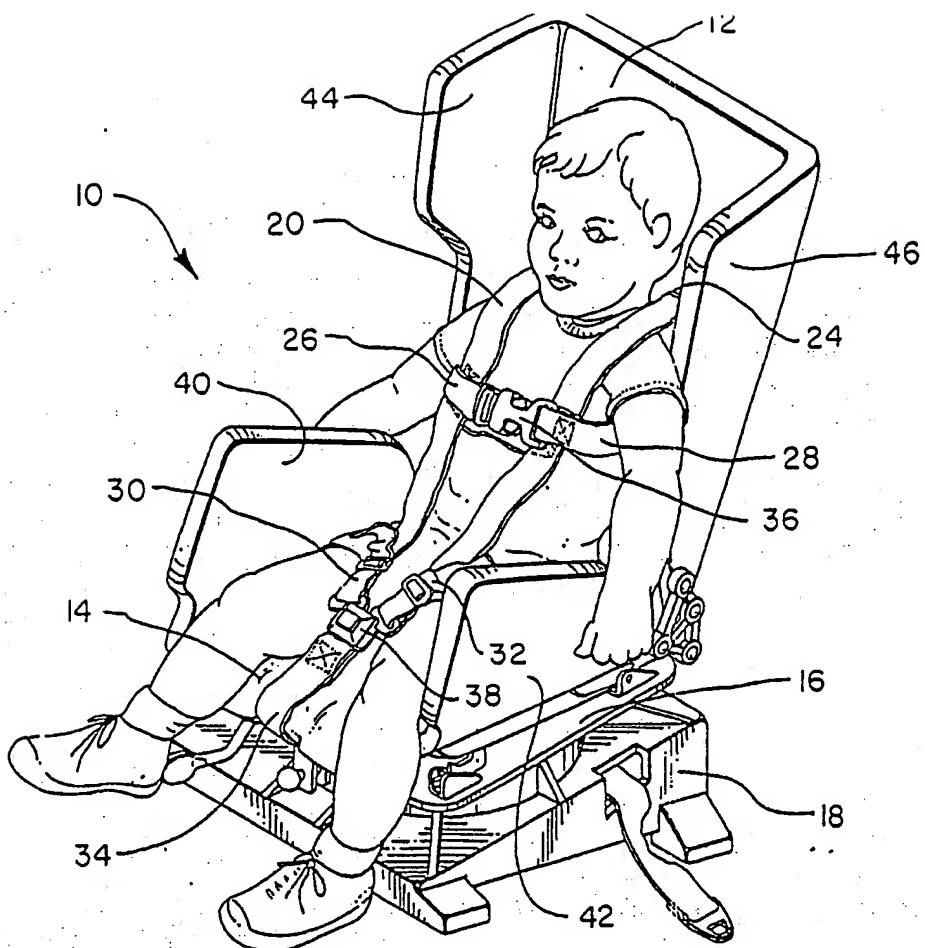
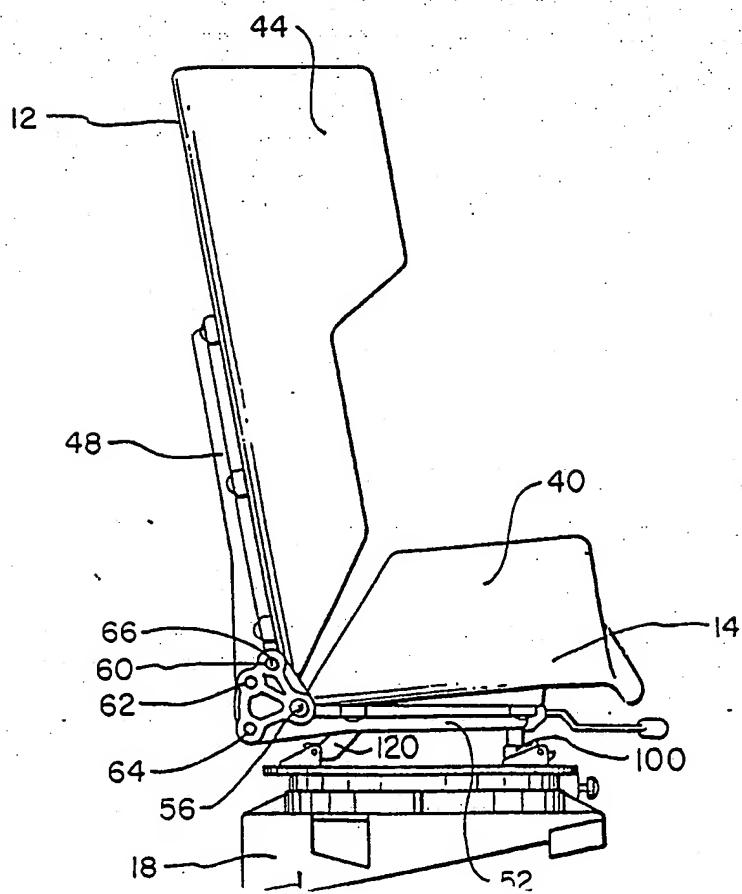


FIG. 1



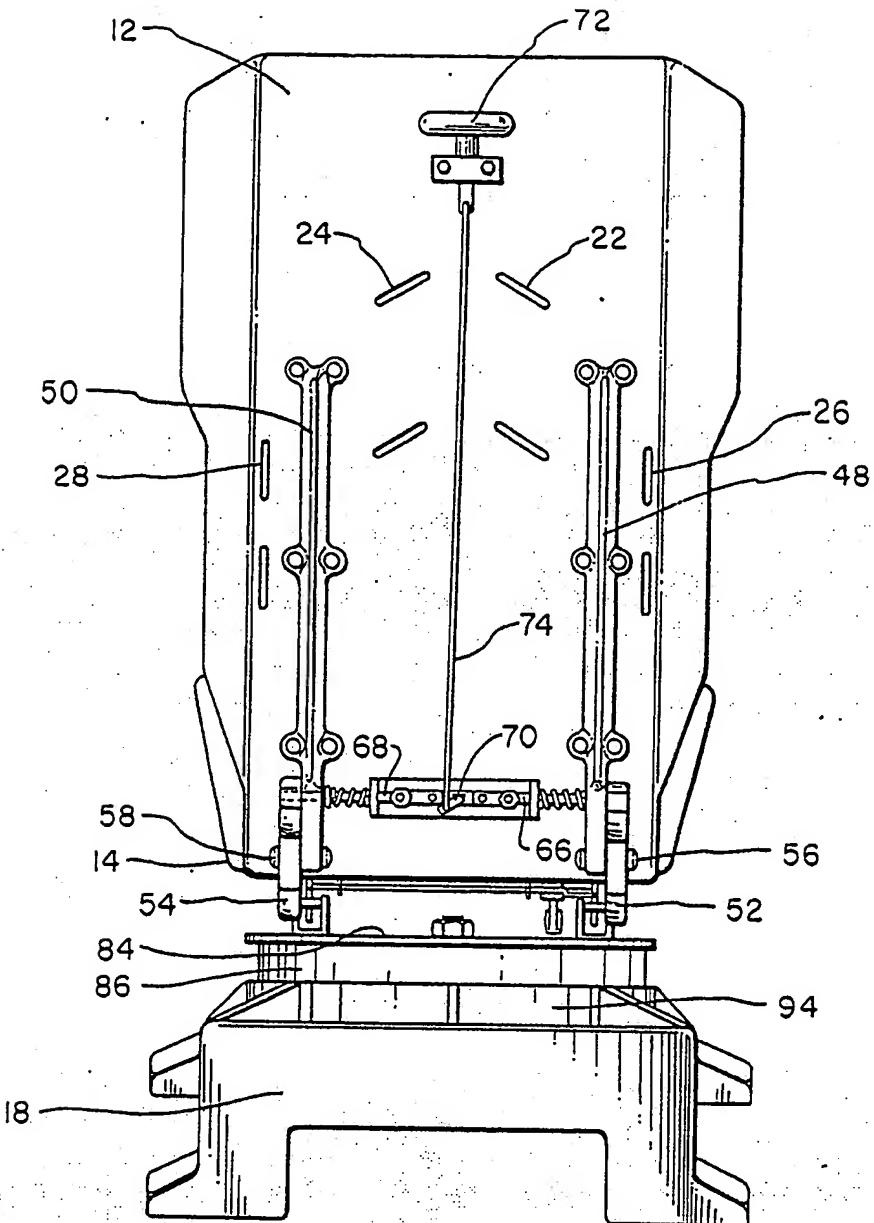
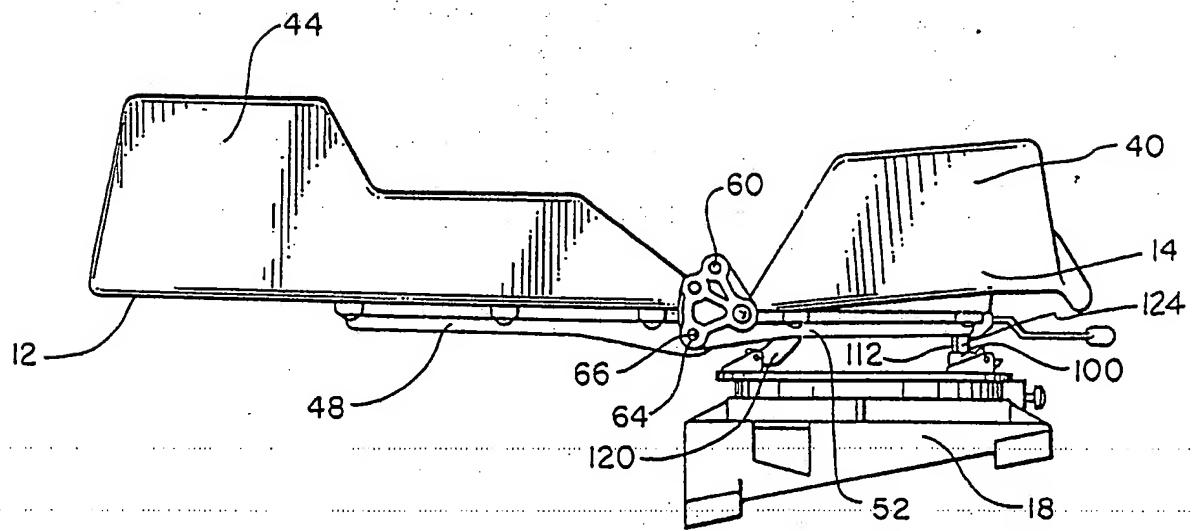


FIG. 3



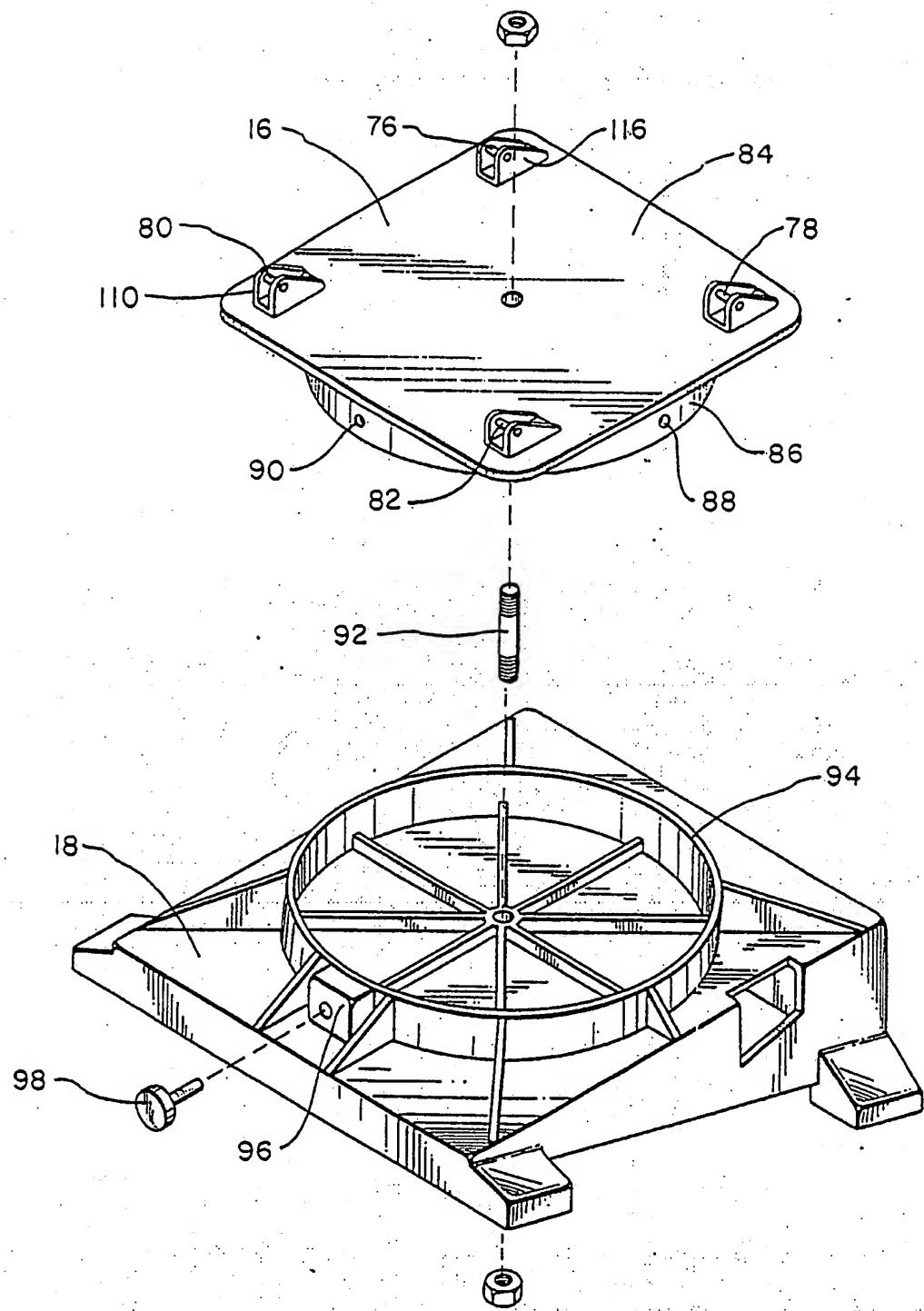


FIG. 5

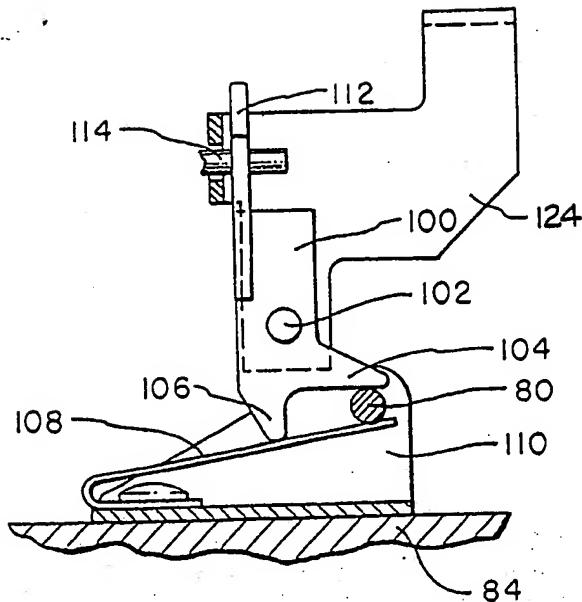


FIG. 6A

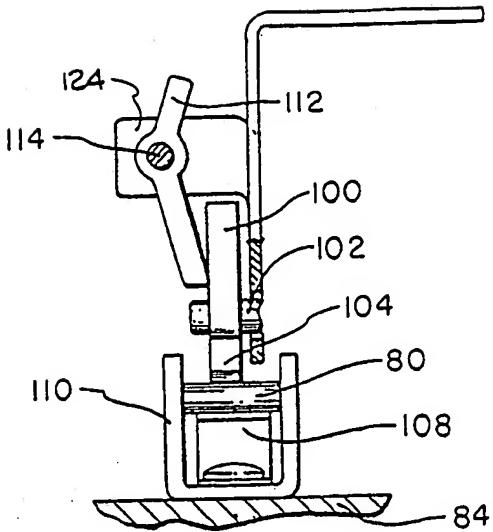


FIG. 6B

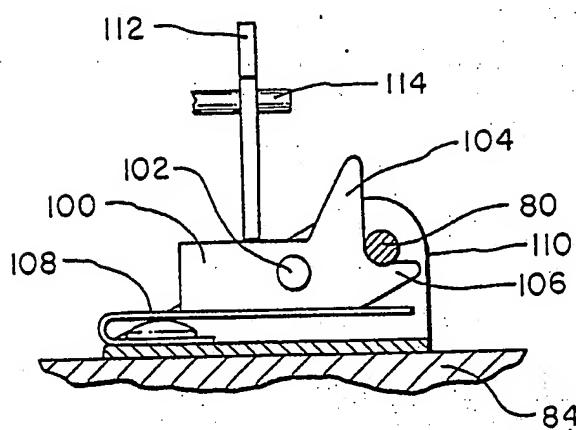


FIG. 7A

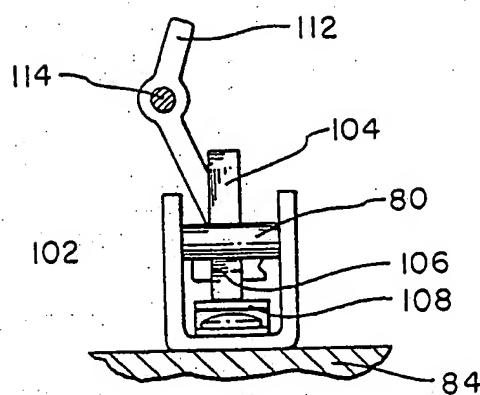


FIG. 7B

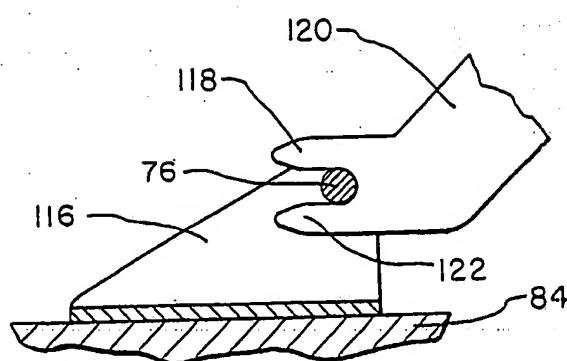


FIG. 8